

TAXONOMY, COMPARATIVE MORPHOLOGY, AND GEOGRAPHICAL
DISTRIBUTION OF THE NEOTROPICAL GENUS *HYPSELARTEMON* WENZ, 1947
(GASTROPODA: PULMONATA: STREPTAXIDAE)

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ABSTRACT

The diagnosis and geographical distribution of the genus *Hypselartemon* Wenz, 1947, which was originally proposed as a subgenus of *Rectartemon* Baker, 1925, were re-examined based on preserved material, including type specimens, collected since the nineteenth century and deposited in scientific institutions. The comparative morphology of shell, radula, and soft body parts, when available, of *Hypselartemon alveus* (Dunker, 1845), *H. contusulus* (Férussac, 1827), *H. deshayesianus* (Crosse, 1863), and *H. paivanus* (Pfeiffer, 1867) were analyzed in order to redescribe and to highlight characters that can be used for species identification. Examination of the reproductive organs revealed significant differences among the species, all of which are endemic to the state of Rio de Janeiro, Brazil, and do not occur in Colombia as originally suggested. These results seem useful in examining the taxonomy and systematics of the Neotropical Streptaxidae.

Key words: Streptaxidae, *Hypselartemon*, taxonomy, morphology, neotropics.

INTRODUCTION

The family Streptaxidae includes carnivorous land snails distributed throughout the tropics and subtropics (Bruggen, 1967). Most of the Brazilian Streptaxidae were described in the 19th and first half of the 20th centuries by foreign malacologists, such as Férussac (1827), Pfeiffer (1849, 1850a, 1867), Pilsbry (1897, 1930), and Baker (1914). The descriptions were often based only on shell characters, usually without illustrations. The synopses of Gude (1902), Kobelt (1910), and Richardson (1988) are still the most comprehensive papers on the South American Streptaxidae species and provide references indispensable for work on the family.

Due the scarce understanding of the internal anatomy of Streptaxidae, most genera that occur in Brazil still have taxonomic problems and remain diagnosed only by shell characters. *Hypselartemon* Wenz, 1947, was originally described as a subgenus of *Rectartemon* Baker, 1925, with *Rectartemon* (*Hypselartemon*) *alveus* (Dunker, 1845) as the only species explicitly included. Wenz (1947) sug-

gested that *Hypselartemon* might include more species, but without listing them, with a distribution restricted to Brazil and Colombia.

Despite being characterized by Zilch (1960) and treated as a valid subgenus by Vaught (1989), *Hypselartemon* as well as *Rectartemon* were considered as junior synonyms of *Artemon* Beck, 1837, by Richardson (1988). Indeed, there has long been disagreement regarding the taxonomic validity of *Streptaxis* Gray, 1837, *Artemon*, and *Rectartemon*, as discussed by Deshayes (1851), Baker (1925), Thiele (1927), Pilsbry (1930), and Solem (1956).

Barbosa et al. (2002) redescribed *Helix contusula* Férussac, 1827, with a new generic arrangement in *Hypselartemon*, a status suggested by Salgado & Coelho (2003) to include the following species with an ovate shell and a high spire: *Hypselartemon alveus* (Dunker, 1845), *H. deshayesianus* (Crosse, 1863), and *H. paivanus* (Pfeiffer, 1867).

Here, we recharacterize the genus *Hypselartemon* and all species using conchological data and the morphology of soft body parts, when available, in order to improve the taxonomy of the Brazilian Streptaxidae.

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METHODS

Institutional Abbreviations

Specimens examined are found in the mollusc collections of the Academy of Natural Sciences of Philadelphia, Pennsylvania, U.S.A. (ANSP), Muséum National d'Histoire Naturelle, Paris, France (MNHN), Museu Nacional, Universidade Federal do Rio de Janeiro, Brazil (MNRJ), and Senckenberg-Museum, Frankfurt am Main, Germany (SMF).

Morphological Examination

Terminology for shell and soft body parts were adopted from Rezende et al. (1962), Berry (1965), and Picoral & Thomé (1998). For adult shells, the following characters were measured using a Cannon Caliper Rule: H: total shell height; Hs: spire height; DM: major shell diameter; dm: minor shell diameter; Du: major umbilicus diameter; Ha: aperture height; Da: major aperture diameter. Modal values of dimension were used in the diagnosis. The number of whorls was determined according to Diver (1931).

Shell illustrations were obtained from different sources – a digital camera (MNHN types; Figs. 7, 10, 13), a camera coupled to a Zeiss SV11 stereomicroscope (Fig. 13), scanned from original illustrations (Fig. 4) or micrographs taken with a LEO 1450 VP electron microscope (Figs. 5, 6, 8, 9, 11, 12).

Living specimens were drowned in water and preserved in 70% ethanol. Soft parts were isolated after crushing the shells, and were dissected under a light microscope (Zeiss Stemi SV11) that was coupled to a camera lucida.

RESULTS

The most important conchological criteria used to diagnose the species were the spire height and its relation to total height of shell and the body whorl deflection. A detailed characterization of *H. contusula*, including its soft parts, was previously published by Barbosa et al. (2002).

Hypselartemon Wenz, 1947

[Greek: *hypselos*, high; *artemon*, pulley]
Rectartemon (*Hypselartemon*) Wenz, 1947: 36
 – Zilch, 1960: 558; Vaught, 1989: 91.
Hypselartemon Wenz, 1947 – Barbosa et al., 2002: 2; Salgado & Coelho, 2003: 170.

Type Species

Streptaxis alveus Dunker, 1845, by original designation; Brasilia; Neufreiburg, Prov. Rio Janeiro.

Distribution Originally Suggested

“Brasilien, Columbia”.

Distrubution Here Suggested

Brazil, Rio de Janeiro state.

Included Species

Hypselartemon alveus (Dunker, 1845), *H. contusulus* (Férussac, 1827), *H. deshayesianus* (Crosse, 1863), and *H. paivanus* (Pfeiffer, 1867).

Original Diagnosis

“Gehäuse kreiselförmig, etwa so hoch wie breit, mit stärker (als bei *Rectartemon* s. str.) erhobenem Gewinde und 8–10 Umgängen. D = 10–28 mm”.

Diagnosis

Shell whitish in color, small, ovate to cupuliform, robust, with prominent spire, almost as high as wide, 6–10 convex whorls. Body whorl flattened to convex, slightly deviating or not from columellar axis. Peristome strongly reflected. H = 5.0–13.0 mm; DM = 5.0–9.5 mm.

Hypselartemon alveus (Dunker, 1845)
 (Figs. 1–3)

Streptaxis alveus Dunker, 1845: 7, pl. 6, fig. 14 – Pfeiffer, 1848a: 4; 1850b: 15, pl. 101, figs. 33–35; Hupé, 1857: 20; Gude, 1902: 207–208; Kobelt, 1905: 29–30.

S. [treptaxis] alveus Dunk. [“section *Artemon*”]
 – Pfeiffer & Clessin, 1881: 15.

Streptaxis (*Eustreptaxis*) *alveus* Dunker – Tryon, 1885: 69, pl. 27, fig. 11; Kobelt, 1910: 144.

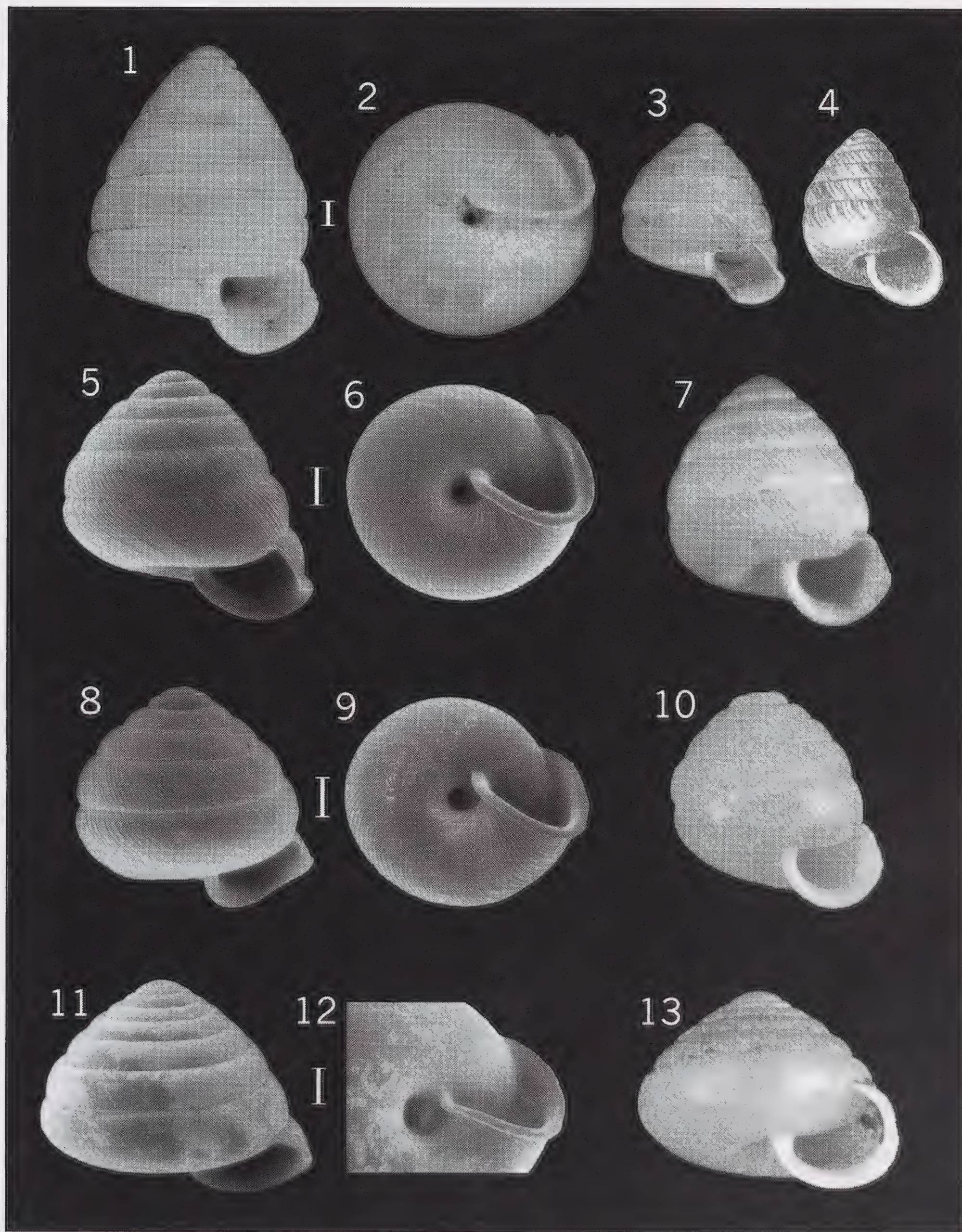
S. [treptaxis] (A. [rtemon]) alveus Dunker – Thiele, 1931: 729.

Alcidia alveus (Philippi) – Bourguignat, 1889: 7.
Artemon alveus (Dunker, 1845) – Lange-de-Morrete, 1949: 166; Richardson, 1988: 174.
Rectartemon (*Hypselartemon*) *alveus* (Dunker) – Wenz, 1947: 36; Zilch, 1960: 558, fig. 1953; 1961: 81.

Hypselartemon alveus (Dunker, 1845) – Barbosa et al., 2002: 2–3; Salgado & Coelho, 2003: 170.

Type Locality

“Neufreiburg, Prov. Rio Janeiro” (Dunker, 1845).



FIGS. 1–13. *Hypselartemon* spp. shell. FIGS. 1–3: *H. alveus*, ANSP 23728; frontal, basal (H = 12.2 mm; DM = 9.4 mm) and juvenile (H = 8.0 mm; DM = 7.6 mm); FIG. 4: *Helix contermina*; FIGS. 5–7: *H. contusulus*, MNRJ 8436 (5–6; H = 6.4 mm; DM = 5.9 mm) and MNHN (7 – Lectotype; H = 6 mm; DM = 5.1 mm); FIGS. 8–10: *H. deshayesianus*, MNRJ HSL3395 (8–9; H = 5.5 mm; DM = 6 mm) and MNHN (10 – Syntype; H = 5 mm; DM = 5.5 mm); FIGS. 11–13: *H. paivanus*, MNRJ 8350 with umbilicus detail (11–12; H = 5.7 mm; DM = 6.8 mm) and MNHN (13 – Syntype; H = 5.0 mm; DM = 6.0 mm). Photo 1 by A. F. Barbosa; photos 2–3 by P. M. S. Costa; photo 4 after Tryon (1885: pl. 12, fig. 19); photos 5–6; 8–9; 11–12, electron micrographs; photos 7; 10 and 13 by P. Maestrati. Scale bars: 1 mm.

Distribution

Brazil, Rio de Janeiro state, Nova Friburgo.

Diagnosis

Shell with very high spire (Hs: 7.5 mm), body whorl short, flat at its base, without deviation from columellar axis.

Description

Shell (Figs. 1–3): Triangular, taller than wider, robust, whitish, with $8\frac{1}{2}$ –10 slightly convex whorls. Protoconch with $1\frac{1}{3}$ whorls, usually smooth, sometimes with some granulation or lightly striated. Spire very high. Suture shallow. Next to half of second whorl there is a deeply delimited border; from there whorls become wider, less convex, almost flat, with deeply marked striae. Body whorl short, flat at its base, about $\frac{1}{5}$ of total shell height, without deviation from columellar axis, striated until umbilicus. Aperture luniform, descendant, long, narrow; peristome reflected, expanded from its base to columellar lip, where it enlarges and covers $\frac{1}{3}$ of narrow umbilicus; parietal lip flat, external lip with elliptical base.

Dimensions (mm): H: 10–12.4; Hs: 7.3–7.7; DM: 9.0–9.4; dm: 8.5–9.0; Aperture: Ha: 4.0–4.3; Da: 3.6–4.0. Umbilicus: Du: 0.6.

Remarks

Helix contermina Reeve, 1854 (pl. 191, sp. 1342) (Fig. 4), originally described with 6–7 whorls, pupiform, conic-globose, convex at its base and from an unknown locality, was considered as a junior synonym of *H. alveus* by Pfeiffer (1859), Pfeiffer & Clessin (1881), Tryon (1885), Gude (1902), Kobelt (1905, 1910), and Richardson (1988). We compared the original diagnosis and shell illustration of *H. contermina* and its later copy by Tryon (1885) with shells and illustrations of *H. alveus*. These two species differ in that *H. contermina* has almost half the number of whorls and shell height, as well as a convex body whorl base, contrasting with the flat and plane body whorl base of *H. alveus*. Even young shells of *H. alveus*, the size of which are close to that of *H. contermina*, have a notable flat body whorl base just like adult shells. We were not able to locate the type material of *H. contermina* in any of the many museums consulted. Despite being considered a junior synonym of *H. alveus* by many authors, we consider the available data doubtful and insufficient to confirm its taxonomic position, until type material of *H. contermina* can be found and properly examined.

Juvenile shells of *H. alveus* were also examined and have similar dimensions as *H. deshayesianus* and *H. contusulus*. They differ in that *H. alveus* has a very short and flat body whorl, whereas the shells of *H. deshayesianus* and *H. contusulus* are more convex. This information might be useful in the taxonomic identification of *Hypselartemon* shells in collections without precise indication of the collect locality.

Neither living specimens nor empty shells of *H. alveus* have been found in recent collections in the vicinity of its type locality.

Material Examined

Brazil (without more precise locality), ANSP 4353, 1 shell, A. D. Brown coll.; ANSP 23727, 1 shell, Swift coll.; Anthony coll.; ANSP 23728, 4 shells, J. S. Phillips coll. SMF 136864, 1 shell, Kobelt colln. [“typoide”? – Orig. fig., Kobelt (1905) and Zilch (1960), according to Zilch (1961)].

Hypselartemon contusulus (Férussac, 1827)
(Figs. 5–7)

Helix (Helicogena) contusula Férussac, 1827: 302 – Rang, 1831: 9; Chevalier, 1966: 1009. *A.[rtemon] contusulus* (Fer.) – Beck, 1837: 48. *Hypselartemon contusulus* (Férussac, 1827) – Barbosa et al., 2002: 1–10.

Type Locality

“Rio-Janeiro” (Férussac, 1827).

Distribution

Rio de Janeiro State, (...) “dans les bois et sous les baies” (Rang, 1831); Angra dos Reis, Ilha Grande (Barbosa et al., 2002).

Diagnosis

Shell with high spire (Hs: 3.5 mm) and convex body whorl that slightly deviates from columellar axis. Cylindrical penial complex slender, with or without spines. Free oviduct cylindrical, rectilineal: vas deferens wide at its insertion with prostate, narrow where it emerges from penial muscular sheath. Penis with long, muscular sheath, thick, strong.

Description

See Barbosa et al. (2002).

Dimensions (mm): H: 5.0–6.8; Hs: 3.3–3.6; DM: 5.0–6.4; dm: 4.8–5.3. Aperture: Ha: 2.2–3.0; Da: 2.4–2.8. Umbilicus: Du: 0.6–0.8.

Remarks

The species was first collected by Sander Rang, an officer of the French Royal Navy,

during the Great Indias Expedition, and sent to Férussac, who described it without any illustration in an obscure journal (Férussac, 1827). Chevalier (1966) noted that *H. contusula* was not mentioned in Férussac's *Histoire Naturelle des Mollusques* (Férussac & Deshayes, 1819–1851). As a result, the species remained unrecorded for over a century in the malacological literature. It was re-described by Barbosa et al. (2002) based on syntypes in the MNHN and material recently collected in Ilha Grande, Angra dos Reis, State of Rio de Janeiro, Brazil.

Although not mentioned in the recharacterization by Barbosa et al. (2002), the presence of external spines in the middle portion of phallus of *H. contusulus* was observed in one dissected specimen. These structures are common in Streptaxidae, as well as in other Stylommatophora, and were discussed by Berry (1965), Gerlach (1995), and Picoral & Thomé (1998).

Material Examined

Lectotype (designated by Barbosa et al., 2002): Brazil, Rio de Janeiro, MNHN 1 shell, Rang coll.; Paralectotypes: same designation and data as lectotype, MNHN 2 shells (1 young); Angra dos Reis, Ilha Grande (23°11'S, 44°12'W), Parnaioca beach footpath, on or buried under the soil and among dead leaves and decaying material, MNRJ 8436, 1 shell, N. C. Salgado & S. B. Santos colls., 15/VIII/1996; MNRJ 8440, 3 specimens, N. C. Salgado & S. B. Santos colls., 27/IV/1996; MNRJ 8442, 6 specimens (1 young), S. B. Santos & V. Queiroz colls., 08/V/1997; MNRJ 8438, 5 specimens (1 young), A. F. Barbosa, S. B. Santos & P. M. Coelho colls., 16/I/1998; MNRJ 8439, 2 specimens, A. F. Barbosa, S. B. Santos & R. S. Massa colls., 17/I/1998; MNRJ 8437, 1 specimen, A. F. Barbosa coll., 16/I/1999; MNRJ 7727, 5 specimens (3 young), S. B. Santos coll., V/1997; MNRJ 7717, 2 shells, S. B. Santos coll., 30/V/1997; MNRJ 8441 soft parts + 1 roof of pallial cavity + 2 systems (reproductor and digestive). Ilha Grande, Parnaioca beach footpath, Toca das Cinzas: MNRJ 7732, 2 shells, S. B. Santos & V. Queiroz colls., 13/VIII/1996; MNRJ 8443, 3 specimens, A. F. Barbosa, S. B. Santos & P. M. Coelho colls., 17/I/1998. Ilha Grande, Cachadaço, MNRJ 7702, 9 shells (3 fragmented), S. B. Santos e V. Queiroz colls., 30/V/1997.

Hypselartemon deshayesianus (Crosse, 1863)
(Figs. 8–10)

Streptaxis deshayesianus Crosse, 1863: 388 – Crosse, 1867: 202, pl. 5, fig. 3; Gude, 1902: 208; 1903: 325; Hidalgo, 1870: 39; 1872: 45–46, pl. 3, figs. 5, 6; Kobelt, 1905: 30, pl. 46, figs. 45; Richardson, 1988: 253–254.

Streptaxis deshayesianus Crosse – Tryon, 1885: 69, pl. 14, fig. 97 in “section *Eustreptaxis*”; “subsection *Edentulae*”.

Streptaxis (Eustreptaxis) deshayesianus Crosse – Kobelt, 1910: 145.

Artemon deshayesianus (Crosse, 1863) – Lange-de-Morretes, 1949: 166.

Hypselartemon deshayesianus (Crosse, 1863) – Barbosa et al., 2002: 3; Salgado & Coelho 2003: 170.

Type Locality

“Habitat ?” (Crosse, 1863).

Distribution

Rio de Janeiro, “Botafogo, dans le Corcobado, à Rio Janeiro (Paz et Martinez)” (Hidalgo, 1870) and Barra da Tijuca.

Diagnosis

Shell small, with short spire (Hs: 2.8 mm), and convex body whorl that slightly deviates from the columellar axis.

Description

Shell (Figs. 8–10): Cupuliform, as high as wide, thin, whitish, translucent, with 6½–7 very convex whorls. Spire short. Protoconch without defined limit, first whorls smooth; next to 1/3 of second whorl there is a deep delimited border; from there, whorls become wider but remain very convex, with regular, strongly marked axial striation to shell base. Suture very deep. Body whorl convex at its base, short, about ¼ of total shell height, briefly deviating from columellar axis, striated until umbilicus, which is wide, deep. Aperture oval, descendent, not very long; peristome round, reflected, expanded from base to columellar lip; parietal lip convex, external lip oval.

Dimensions (mm): H: 5.7–6.0; Hs: 2.7–2.9; DM: 5.8–6.0; dm: 5.0–5.4. Aperture: Ha: 2.1–2.5; Da: 2.5–2.6. Umbilicus: Du: 0.5–0.7.

Remarks

Shells of this species were obtained during the Spanish scientific expedition to Meridional

America, from 1862 to 1865, headed by Don Patrício Maria Paz y Membiela, with the objective increasing the collections of the Madrid museum (Hidalgo, 1872). Sent to Crosse, the species was described in 1863 but not illustrated until 1867. The locality of this material was unknown to Crosse. Hidalgo (1870, 1872) indicated the locality of the shells according to records of Paz and Martinez, members of the Spanish expedition. According to Paz (Hidalgo, 1870), within two hours, more than 100 specimens of the following species were easily collected: "*Streptaxis crossei*, *S. paivanus* and *S. deshayesianus*". The natural habitats of *H. deshayesianus* have been strongly impacted by human activity, being located in the second largest urban area in Brazil. Neither living specimens nor empty shells of *H. deshayesianus* have been found in recent collections in the city of Rio de Janeiro.

As early as 1872, Hidalgo observed that *H. deshayesianus* was very similar to *H. alveus*.

Material Examined

Brazil, Rio de Janeiro, MNHN (syntypes, according to label information) 2 shells, M. Hidalgo coll.; Barra da Tijuca, MNRJ HSL3395, 4 shells, H. S. Lopes coll., VIII/1952.

Hypselartemon paivanus (Pfeiffer, 1867)
(Figs. 11–15)

Streptaxis paivana Pfeiffer, 1867: 43, pl. 1, fig. 2.

Streptaxis paivanus Pfeiffer – Hidalgo, 1870: 39; 1872: 44–45, pl. 3, figs. 3, 4; Gude, 1902: 230; 1903: 326.

Streptaxis paivanus Pfr. – Pfeiffer & Clessin, 1881: 15; Tryon, 1885: 62, pl. 12, figs. 7, 8, in "section *Artemon*"

Streptaxis (Streptartemon) paivanus L. Pfr. – Kobelt, 1905: 37–38, pl. 46, figs. 6, 7; 1910: 145.

Alcidia paivana (Pfeiffer) – Bourguignat, 1889: 47.

Artemon paivanus (Pfeiffer, 1867) – Lange-de-Morrete, 1949: 166.

Streptartemon paivanus (Pfeiffer, 1867) – Richardson, 1988: 250.

Hypselartemon paivanus (Pfeiffer, 1867) – Barbosa et al., 2002: 3; Salgado & Coelho, 2003: 170.

Type Locality

"Hab. in Brasília loco Macahe dicto" (Pfeiffer, 1867).

Distribution

Brazil, Rio de Janeiro State: Macaé, Búzios, Cabo Frio, Arraial do Cabo and Araruama.

Diagnosis

Shell with short spire (Hs: 3.3 mm) and wide diameter. Short body whorl slightly convex at its base, not deviating from the columellar axis. Umbilicus very deep, wide. Penial complex wide, bearing corneous spines; free oviduct wide, curved; vas deferens with narrow diameter along its entire length. Sheath of penis thin, membranous, short.

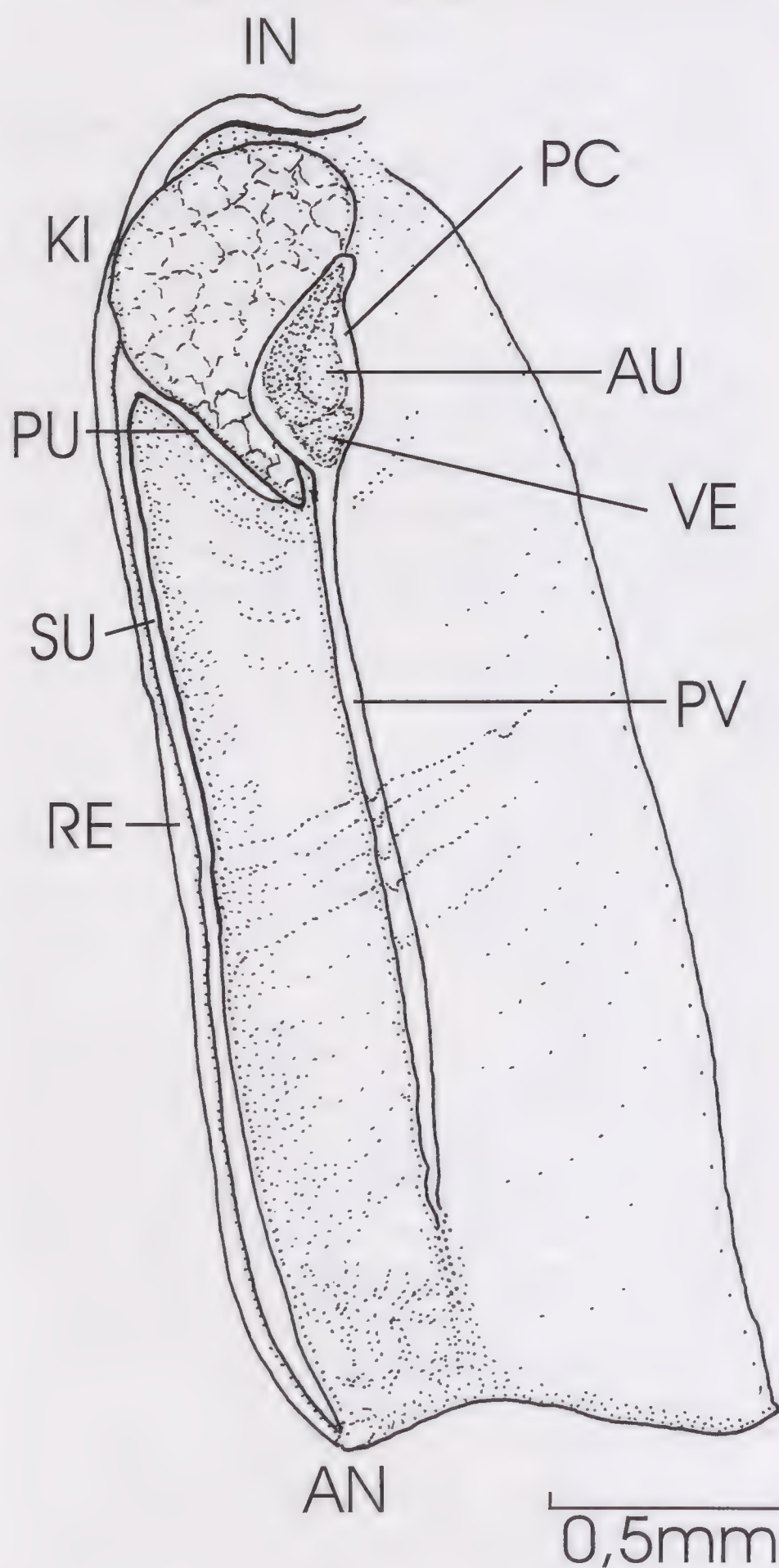


FIG. 14. *Hypselartemon paivanus*, roof of pallial cavity. AN – anus; AU – auricle; IN – intestine; KI – kidney; PC – pericardium; PU – primary ureter; PV – pulmonary vein; RE – rectum; SU – secondary ureter; VE – ventricle.

Description

Shell (Figs. 11–13): Cupuliform, wider than tall, whitish, translucent, thin, with 7–8 $\frac{1}{2}$ convex whorls. Protoconch without defined limit. Spire very short. Deep suture. First whorls smooth; next to $\frac{5}{8}$ of the second whorl there is a deep delimited border; from there whorls become more convex and wider, with strongly marked regular axial striae that continue to shell base. Body whorl slightly convex, short, about $\frac{1}{3}$ of the total shell height, not deviating from columellar axis. Aperture circular, descendent, not long; parietal lip convex; peristome round, not expanded, reflected from base to columellar lip. Umbilicus very wide, deep.

Dimensions (mm): H: 5.4–6.4; Hs: 3.2–3.4; DM: 6.2–7.8; dm: 6.3–6.7. Aperture: Ha: 2.5–3.0; Da: 3.2–3.3. Umbilicus: Du: 1.0–1.2.

Radula: Long and slender ribbon, with about 45 sharply pointed unicuspid teeth in transverse row (22-1-22), size increasing from marginal to lateral. Central teeth reduced, slender, curved.

Roof of Pallial Cavity (Fig. 14): Long, slender, narrow, strongly wrinkled, macroscopic venation not conspicuous, except for the wide pulmonary vein, which leaves the pericardium and approaches the mantle edge. Heart pear-shaped, auricle and ventricle well defined. Kidney distally globose with constriction in

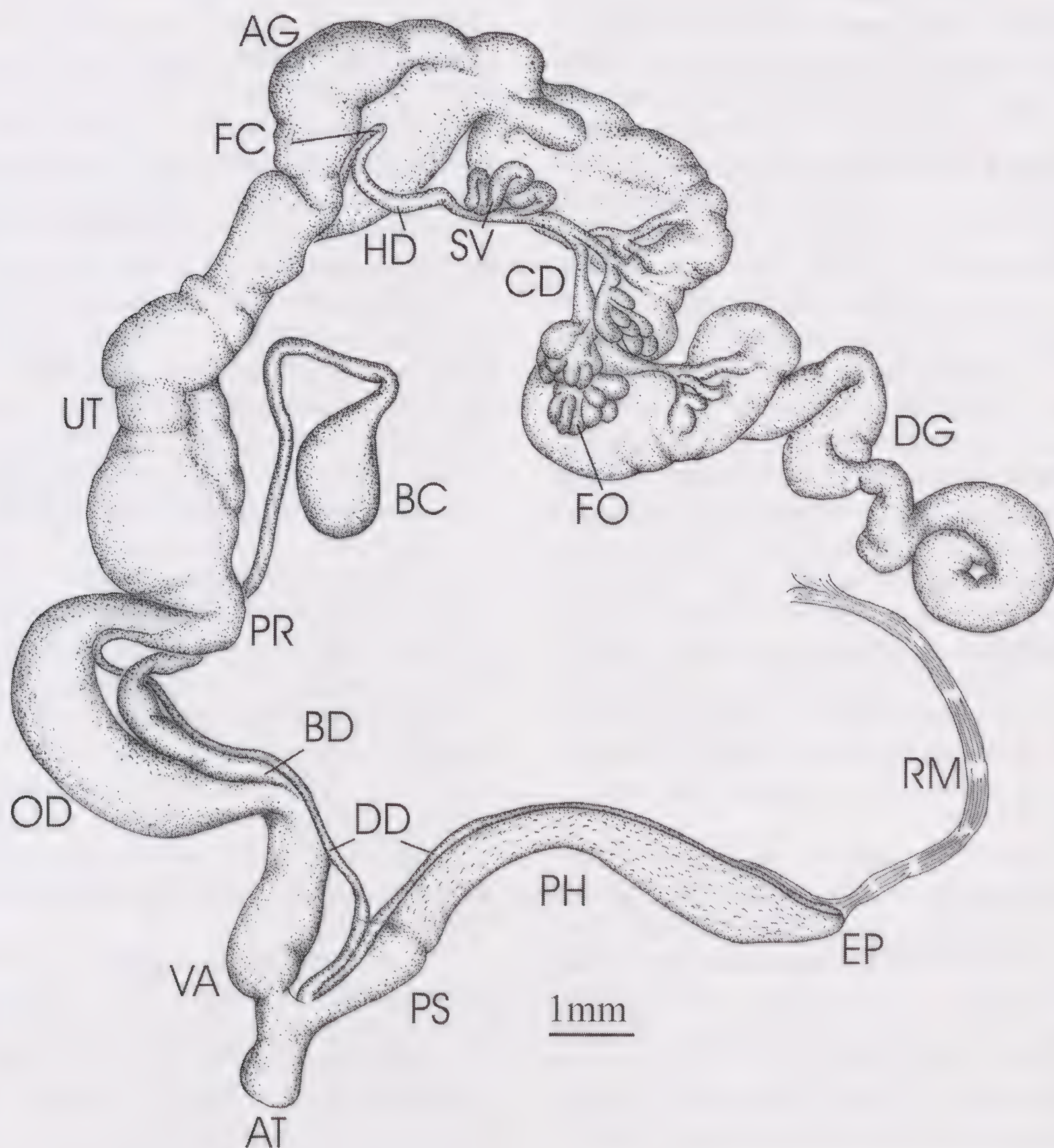


FIG. 15. *Hypselartemon paivanus*, reproductive system anatomy. AG – albumen gland; AT – atrium; BC – bursa copulatrix; BD – bursa copulatrix duct; CD – collecting duct; DD – vas deferens; DG – digestive gland; EP – epiphallus; FC – fertilization complex; FO – follicles; HD – hermaphroditic duct; OD – free oviduct; PH – phallus; PR – prostate gland; PS – penial sheath; RM – penial retractor muscle; SV – seminal vesicle; UT – uterus; VA – vagina.

proximal part, where the sigmoid-shaped primary ureter exits, following the margin of the kidney until the origin of the secondary ureter, which follows close to the rectum until mantle edge.

Reproductive Organs (Fig. 15): Ovotestis embedded in the digestive gland, consisting of follicle groups that open into the collecting duct. Hermaphroditic duct long, narrow. Seminal vesicle emerging from median portion of hermaphroditic duct, consisting of a sinuous blind tube similar in width to the hermaphroditic duct. Fertilization complex embedded in albumen gland, externally constituted of a hermaphroditic duct fold and albumen gland duct. Spermoviduct with wrinkled uterus and prostate gland. Free oviduct large, curved, C-shaped, narrower where it inserts in spermoviduct. Bursa copulatrix duct emerges near middle of the free oviduct, far from the point where vas deferens emerges from prostate. Phallus narrow next to the atrium and wider in its middle part up to the epiphallus, where it constricts at the top. It is armed with small external corneous spines, notably on its middle part. Penial retractor muscle slender, narrow, similar in width to vas deferens, very long, approximately as long as phallus and epiphallus together. Narrow vas deferens emerges from prostate, follows free oviduct and dive under penial sheath until its terminal portion, where it folds and emerges again, coupled to phallus. Then, it follows all the phallus extension in a sinuous or rectilinear trajectory, inserting at epiphallus constriction, near insertion of muscular retractor penis. Penial sheath thin, membranous, of $1/5$ of total length of penial complex. Atrium globose, vagina of same width as first third of penis.

Remarks

Specimens of *H. paivanus* are found in areas near beaches, with sandy soil and typical “restinga” vegetation (costal dune forest). Their shells can be found in relative abundance, but living specimens are rare. In its natural habitat, other terrestrial molluscs were collected and could form part of the diet of *H. paivanus*, include species of Helicinidae, Subulinidae and juvenile Bulimulidae and Strophocheilidae.

Material Examined

Brazil, Rio de Janeiro, MNHN (syntypes, according to label information) 3 shells (1 from Cabo Frio), Journ. Conchy. coll., M. Hidalgo coll.; Arraial do Cabo, MNRJ 8349, 7 specimens + 1 cephalopedious mass + 1 radula, B.

S. Dunley coll., 9/III/2000; Prainha, MNRJ 8349, 4 shells + 3 reproductive systems + 2 roof of palial cavity + 1 nervous system + 1 bucal mass, C. J. F. Costa col., 03/XI/2001; Praia do Forno, MNRJ 7542, 2 shells, P. Jurberg col., 14/IV/1963; MNRJ 8350, 3 shells, A. F. Barbosa & V. Bessa colls., 21/VII/2000; MNRJ 9750, 16 shells, J. C. Monteiro col., 18/I/2001; Búzios, Praia da Tartaruga, MNRJ 8351, 3 shells, A. F. Barbosa & V. Bessa colls.; 22/VII/2000.

DISCUSSION

Hypselartemon was considered a subgenus of *Rectartemon* by Zilch (1960) and Vaught (1989) and a synonym of *Artemon* by Richardson (1988). Following Barbosa et al. (2002) and Salgado & Coelho (2003), we consider *Hypselartemon* to have generic status based on its shared morphological characters.

Shells data including dimensions, shape, spire height and peristome reflection obtained by comparative analysis in four species were in accordance with the *Hypselartemon* original diagnosis (Wenz, 1947), reviewed by Zilch (1960) and Barbosa et al. (2002). Earlier, Hidalgo (1872) already noticed a strong morphological resemblance of *H. alveus* and *H. deshayesianus*. The similar appearance of both species led Bourguignat (1889) to group *H. alveus* and *H. paivanus* in a separate genus *Alcidia* Bourguignat, 1889.

In comparison with other Brazilian Streptaxidae genera, *Hypselartemon* can be considered a well-defined group – its shell is not strongly detorted, as in *Streptaxis* or *Streptartemon* Kobelt, 1905; it is smaller in diameter and proportionally higher than *Rectartemon* or *Artemon* and *Martinela* Jousseaume, 1887; and it has a circular aperture differing from the monotypic *Sairostoma* Haas, 1938.

The dimensions originally proposed for *Hypselartemon* shells (“D = 10–28 mm”) were not completely congruent with the dimensions found in the species that we studied. *Hypselartemon alveus*, which is the type species of the genus and the only species recognized by Wenz (1947), has a diameter of 9.4 mm, which is close to the lower limit suggested in the *Hypselartemon* original diagnosis. The upper limit of 28 mm mentioned by Wenz (1947) is not found in any of the species included in the genus. Wenz (1947) probably went too far in estimating those dimensions, once a shell with

a diameter of 28 mm and a tall spire, as diagnostic for *Hypselartemon*, has never been described as Streptaxidae species in South America.

The lower limit of the number of whorls of *Hypselartemon* shells originally indicated (8 whorls) also did not include the number of whorls in two of the four species examined: *H. contusulus* (6–7½ whorls) and *H. deshayesianus* (6½–7 whorls).

The shell morphology of *H. contusulus* is very similar to that of *H. deshayesianus* considering the number of whorls and shell height, differing in that the former has a more convex body whorl that deviates less from the columellar axis, and a smaller umbilicus. *Hypselartemon alveus* and *H. paivanus* have a higher number of whorls (9½ and 8½ respectively), the body whorl does not deviate from the columellar axis, and the spire is flattened at its base. *Hypselartemon alveus* is the tallest species (H: up to 12.7 mm). *Hypselartemon paivanus* has the largest shell width compared to shell height (DM: 7.2 mm) (Barbosa et al., 2002).

Examination of the soft parts, mainly of the reproductive system, revealed significant differences between *H. paivanus* and *H. contusulus* (Table 1). The group numbers and arrangement of the follicles in ovotestis, the shape and size of the seminal vesicle, and the length and absence of ramifications of the penial retractor muscle are similar in these two species.

The roof of pallial cavity of *H. paivanus* is similar to Pilsbry's (1907) illustration for *Streptartemon deformis* (Férussac, 1821). It differs from *H. contusulus* in that the latter has a more conspicuous macroscopic venation. Both are long, slender, narrow, and wrinkled, as is common for Streptaxidae.

Structure and form of the radula of *H. paivanus* are similar to that of *H. contusulus*, as examined by Barbosa et al. (2002), and differs basically in the number of teeth per transverse row. Solem (1974) provided an examination on the diversity of radular modifications among carnivorous land snails and its implications on feeding habits. The relevance of Brazilian Streptaxidae radula for species diagnosis is not clear yet.

In his introduction to Streptaxidae, Bruggen (1967) noted that the anatomical data about the family are "few and far between". The lack of soft part informations is still a problem for worldwide malacologists working on Streptaxidae, as recently argued by Clements (2006). The bulk of Streptaxidae specimens deposited in museums collections are only empty shells. Generic definitions and diagnostics characters for Brazilian Streptaxidae remains based on shell data. As common for Stylommatophora, characters of genitalia are most informative for its taxonomy and phylogeny. However, due to the lack of soft parts of two *Hypselartemon* species examined, we were not able to use soft parts characters in the generic diagnosis, until more work on comparative morphology in the family can be properly done.

The original geographical distribution suggested for *Hypselartemon* (Brazil and Colombia) could not be confirmed according to the species included until now in this genus. The search for *Hypselartemon* specimens in mollusc collections in Colombia (Universidad Nacional de Colombia, Instituto de Ciencias Naturales and Instituto Alexander von Humboldt) was unsuccessful. Published records and collection data indicate that species of *Hypselartemon* are endemic to the state

TABLE 1: Summary of the reproductive system differences found in two species examined.

Characters	<i>Hypselartemon paivanus</i>	<i>Hypselartemon contusulus</i>
Free oviduct	large, strongly curved, C-shaped	narrow, cylindrical, rectilinear, long
Vas deferens	narrow in its entire length	emerges with larger diameter from penial muscular sheath
Penial complex	enlarged with epiphallus constricted on top, always bearing external spines	cylindrical, long, narrowed at epiphallus, bearing external spines or not
Penial sheath	short, thin, membranous	long, thick, muscular, strong
Bursa copulatrix duct	emerges far from ovispermoduct	emerges next to ovispermoduct

of Rio de Janeiro because from the 19th century onwards they have been collected only there. These data can be reinforced by extensive field work of our team and collaborators all around Rio de Janeiro and other states in Brazil. The increasing human impact in areas where species of *Hypselartemon* are found may represent a threat to their conservation because of extensive habitat loss and fragmentation of suitable natural areas.

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